

Portable card to the information processing the invention concerns a portable card to the information processing with a semiconductor chip arranged in the card and with external connection areas, that connected with the Kontaktierungsflächen of the semiconductor chip by a leader network. Correspondingly deceit bar cards, that show for example the form of usual credit cards or check cards, and in its semiconductor chip for example except the unchangeable personal data of the card of proprietor also that account balance of the cards proprietor, that changes according to entry and/or use of the credit card, stored is, are z. B. out of the DE-OS 2220,721 and the DE-OS 2633,164 confessed. End der DE-OS 26,59,573 is declared a portable card with an arrangement for the processing of electric signals, that is arranged in the interior of the card, and with external contact clamps, that connected with the arrangement by a leader network,, rest in that the arrangement and the leader network on one and the same substrate, whose thick are and its areas contents relatively smaller than the areas contents of the card Cavities of the card accommodated is and formed are the contact clamp by contact areas of the leaders of the network over Aussparungen in the card. In this building type, the adjusting of the contact areas of the leader is complicated the network and the Aussparungen of the card to each other and technically costly. The unit existing out of substrate, arrangement and leader network shows different thick so that this unit is in test processes and in the installation into the portable card bad handhabbar. Especially the danger exists that that becomes and/or partially dismantles the arrangement and the external contact clamps connecting leader network in the installation into the portable card because of derunflexiblen connection between contact clamp and arrangement destroyed. It is the task of the invention of creating here remedy, and a portable card to the information processing to plan, is that shows a slight building height, fabrication technical simply producible and handhabbar and incorporated will can in that the semiconductor chip without complication into the card. This task is solved in a card of the from the outset named type invention appropriate for, in that the semiconductor chip in form of a Mikropacks, consisting of a Kunststoffzwischenträger, that with one a larger area is accommodated than the semiconductor chip of showing window and that is equipped unilaterally with a metallic leader network, whose for contacting the Kontaktierungsflächen certain connection fingers into the window hineinragen, whereby the Kontaktierungsflächen of the semiconductor chip to the electric Kontaktierung and That into the window hineinragenden ending of the connection fingers contacted are, in which out of a cards body and at least a cover foil of existing card is arranged, and that the Mikropack as unit on passport cash into a window good Aussparung the cards body, whose thick in about the thick of the cards body corresponds and are arranged on its a surface the external connection areas, is produced. Through use of a semiconductor chip arranged after type a Mikropacks in the card, a slight building height of the card and a flexibility of the leader network contacting the semiconductor chip is enabled. The arranging of Mikropack and external connection areas as separate into a window good Aussparung of the cards body were passport bar unit the divided manufacture of card and semiconductor chip of including unit enables. The sensitive part of the card can be held small and can be formed the card outside of the area of the unit including the semiconductor chip as desired flexible. Both the unit and the finished card sindvöllautomatisch test cash, the uniform thick of the unit a destruction of the leader network prevents and enables a complication free installation. Stability of the portable card and protection of the on passport cash unit before external and mechanical influences is reached in more simply manner in that on the underside of the arrangement formed out of cards body and on passport cash unit a first cover foil is arranged and that on the top of the arrangement formed out of cards body and on passport cash unit a second that is arranged connection areas cover foil leaving out. To the further increase of the stability, it is of advantage to fill the cavity zwischer of first and second cover foil with plastic out. It lies in the frame of the invention, that the Kunststoffzwischenträger on one, in which window good Aussparung of on passport cash, the lower part of the on passport cash unit of forming ground arrangement is arranged, and that over the Kunststoffzwischenträger one the external connection areas leaving out into the window good Aussparung on passport cash and the upper part cover

foil forming the on passport cash unit arranged is in continued education of the invention is planned, when ground arrangementTo plan cavity showing the semiconductor chip form piece overlooked. Even surfaces of the card containing portable the semiconductor chip are reached advantageous manner in that that are reinforced with the leader network of connected, on the Kunststoffzwischensträger present external connection area in its thick and that the external connection areas so are reinforced, that the surface existing out of the reinforced external connection areas and the second cover foil of the card is plan. To the prevention of static charges, it lies in the frame of the invention that the ground arrangement is produced out of an electrically leading material, that the cover foil is produced out of an electrically leading material, that the metallisierte back of the semiconductor chip is at the foil produced out of electrically leading material or arrangement electrically leading and is produced or that at least a cover foil out of electrically leading material. The foils produced out of electrically leading material are advantageous manner or arrangements with the connection area forming external the mass contact electrically leading connected. The invention more closely is clarified in the following based on the figures. Show: fig. Unit on passport cash 1 an execution example for a cards body with eingepasster in thereon visibility, Fig. 2 an invention appropriate for portable card, in that over that in fig. 1 represented arrangement of formed out of cards bodies and on passport cash units a second that is arranged connection areas cover foil leaving out, in thereon visibility, fig. 3 an along cut through an execution example of an invention appropriate for on passport cash unit along the Linie111-111 of the fig. 1, fig. 4 ausschnittsweise an along cut through that as an execution example in the fig. 2 shown cards along the line IV-IV of the fig. 2 and figures 5 to 8 ausschnittsweise along cuts through further execution examples of that in the fig. 2 shown cards along the line IV-IV of the fig. 2. In the figures, same elements with gleichen3ezugs are designated- sign. The execution example after fig. 1 shows an essentially rectangular portable cards body 2, the z. B. correspondingly the valid European check cards standard a width of  $53.98 \pm 0.05$  mm and a length of  $85.6 \pm 0.12$  mm shows. The thick the -out of Thermoplastfolie of produced cards body 2 is for example 0.5 mm. Advantageous manner a window good Aussparung 21 shows the cards bodies 2, in which the EINHEIT1 is, in which a semiconductor chip is in form of a Mikropacks, on passport cash. On einerObPr- area of the unit 1, connection areas 3 connected are arranged with the Kontaktierungsflächen of the semiconductor chip. On the underside of the arrangement 1 formed out of cards bodies 2 and on passport cash unit, a first cover foil is arranged, while on the top of the arrangement 1 existing out of cards bodies 2 and anpassbarer unit a second that is arranged connection areas cover foil 3 leaving out 25. A correspondingly finished card 4 is in thereon visibility in the fig. 2 shown. The connection areas 3 can be felt in conduit of the card 4 by a not represented harvest device. The semiconductor chip 1 contained in the unit can show for example functions as well as Serien-/Parallelwandler, Parallel/Serienwandler, protection code storage, comparison control, data storage for identity code, data storage for bank data and an encoding logic for the exit signal. How in the FIGUREN1 and 2 shown, for example six external connection areas 3 can be planned for a serial information exit apiece, serial information entrance, tact entrance, entrance for a Programmierspannung, reference potential (mass) and supply voltage. The internal construction of the unit 1 is in the fig. 3, the one cross-sections through the execution example of the fig. 1 along the Linie111-111 shows, carried out. In order to reach especially a slight building height of the card 4, is contacted the semiconductor chips 5 in form of a Mikropacks and is arranged in the unit 1. The construction of a Mikropacks is in the DE-HP 20,23,680, that DE-HP 24,14,297 or in the ZeitschriftSiemens-Bauteilereport 16 (1978), notebooks 2, sides 40 to 44 more closely clarifies. As an exit material, a 35 mm of wide high temperature festival Polyimidband 7, the gestanzt serves preferably and z. 8. Correspondingly the measures of a Super-8-Filmes after DIN 15851 perforated becomes. Manufacturer and user can fall back therefore for the necessary fabrication concern on the drives and Fördertechnik of the film industry. The Mondays ago of the integrated control, a copper foil is glued on the Polyimidband 7, partially galvanically verzinkt and so corroded that leader railroad 6 emerge and connection points 18 for the chips. After the cutting of the wide film strip into

four narrow Super-8-Bänder or z. B. two 16-mm-bänder 16-mm-bänder mm of 16-mm-bänder volumes become the hermetical sealed and with lötfähigen connections 17 overlooked semiconductor chips 5 in the films 7 soldered and uncovered in addition with a varnish drop as a contact protection. There the fine copper connections 6 freely in that windows 8 in the Polyimidband 7 hereinragen, are protected the integrated controls flexible gehalten and so against mechanical and thermal bracing. Subsequently the so produced Mikropack piece can be cut for piece vom Polyimidband 7. In one thick of the chip 5 of 0,25t 0.3 mm a total building height for the card 4 of  $0.76 + 0.08$  mm (European check cards standards) and a good flexibility of the unit 1 can be reached by means of a Mikropacks without difficulties. The thick of Polyimidband 7 and leader network 6 amounts to characteristically tightly 0,2mm whereby on that 125/around thick Polyimidband 7 EINE25  $\beta$ im is mounted thick glue layer, then EINE35  $\beta$ im thick copper foil, that is covered at its top with einer 6  $\mu$ m of thick tin layer. In order to enlarge this thick of ETWA200  $\beta$ im on the desired thick of the cards body 2 VON500  $\beta$ im, it is of advantage to thicken the unit 1 and therewith simultaneously to versteifen by what means a possible breach of the chip 5 is prevented. This Verdickung can happen in more simply manner in that the Kunststoffzwischenträger 7 is arranged on a carrier foil 9, that shows advantageous manner such outside dimensions, that it is 2 on passport cash into the window good Aussparung of 21 the cards body, i.e. in geometry and dimensions of the Aussparung 21 corresponds. The carrier foil 9 can be connected for example by Laminieren (gluing under pressure and warmth) with the Kunststoffzwischenträger 7. Your thick can z. B. inclusive of a necessary Klebeschicht about 300  $\mu$ m amount to. The carrier foil 9 is mounted advantageous manner at the side of the Kunststoffzwischenträgers 7, that is not equipped with demmetallischen leader network 6. As a material for the carrier foil 9, plastics can as well as Epoxidharz, especially glasfaserverstärktes Epoxidharz, hard paper or cape sound and metals, like especially brass, but also copper, nickel-iron or bronze to the use come. The use of a correspondingly thicker Polyimidbandes 7 in the manufacture of the Mikropacks would have on the other hand a worse stability as a consequence. Over, if if necessary also on the side of the Kunststoffzwischenträgersi, on which the leader network 6 is arranged, a further foil auflaminiert should become, to terminate the surface of the unit 1 with the external connection areas 3 of the leader network 6 or to create generally an even surface of the unit 1 or the card 4, is planned in further development of the invention, the first of all one connection areas 3 showing external the remaining leader network 6 entsprechende Dicke-To reinforce. This can be reached in more simply manner by raising of a metallic reason material 10 on the part planned than external connection area of the leader network 6. The raising of the metallic reason material 10 can through soldering, sweat or gluing result. As a metallic reason material, advantageous manner becomes an unedles metal, for example brass, feather bronze, nickel-iron or copper used. The metallic reason material 10 is especially simple by means of the bekannten  $\beta$ Reflow-Soldering"-method on the leader network 6 aufzulöten because then an even adjustment arises. That to the leader network 6 there turning points surfaces of the metallic Verdickung 10 become through plating or galvanic treatment with a conductive and where appropriate lötfähigen surface 22 out of tin, silver or gold accommodated. The leader network 6 with the metallic Verdickung 10 will paste, an electrically conductive glue can either directly at that. Underside of the metallic Verdickung 10 arranged will be mounted, or on one in one of the manners described above of appropriate metallic, denübergangs- resistor zwischen Metallverdickung 10 and leader network of 6 slightly holding surfaces layer 22. On that, the external contact areas surface of 3 forming of the metallic Verdickungen 10 can to the increase of the wear stability and in order to reach a contact area with low Übergangswiderstand, by means of Plattierung or by means of a galvanic procedure a further metallic OBERFLÄCHENSCHICHT 23 out of gold, chrome, nickel or silver mounted become. The thick of the metallic reason material 10 and/or the reason material 10 and the layers 22 and 23 so is selected that the thick of the unit 1 the thick of the card 4 corresponds; it is however also possible to thicken the connection areas 3 so, that it out of the surface of the card 4 out shows. In this manner successful without raising on a

certain technology angewiesen zu sein, metallic Verdickungen 10, for which economical materials are applicable. Because by different materials and different surfaces gone out will can, numerous procedures can be used so that the choice of the corresponding technology can be formed flexible. The internal construction of the card 4 is in the fig. 4, the one ausschnittweisen cross-sections through the card of the fig. 2 along the Linie I-V shows, carried out. That in the fig. 3 shown on passport cash unit 1, that so is carried out in the shown execution example, that the thick of Kunststoffzwischenträger 7 and carrier foil 9 the thick of the card. Carriers 2 corresponds, is pressed into the window good AUSSPARUNG 21 the cards carrier 2. On the underside of the arrangement 1 formed out of cards bodies 2 and on passport cash unit, a first cover foil 26 is arranged, corresponds that in its external dimensions to the dimensions of the cards body 2. On the top of the arrangement 1 formed out of cards bodies 2 und einpassbarer unit, a second, that connection areas arranged cover foil 3 leaving out 25, becomes, whose external dimensions also which correspond the cards body 2. In this manner successful to produce a card corresponding portable especially standard measures, that shows an even surface. Cards carriers 2 and the cover foil 25 and 26 can consist of glasfaserverstärktem Epoxid or out of Thermoplastkunststoff and connected become by means of Laminieren. Herewith it is in the raising of the second cover foil 25 of advantage, that corresponds negligibly littler than it of the area of the connection areas 3 to Aussparungen of the cover foil 25, that should receive the connection areas 3, to carry out and to press the second cover foil 25 from above on the connection areas 3 and/or the carrier bodies 2 because so the unit 1 is sealed and vor Verunreinigungen is protected. That between first cover foil 26 and second cover foil 25 and/or between the reinforced connection areas 3 and the carrier foil 9 appearing cavities can through spilling or through Verspritzen with - in the fig. 4 dotted drawn - plastics 11 filled out become so that that of the plastic surface to the plastic underside measured thick the thick of the cards body 2 in about corresponds. As a plastic material, Silikonkautschuk, Epoxidharze or Thermoplaste in question come. The spilling or Verpressen can be undertaken before the installation of the unit in the cards carriers 2 in a form. It is however also possible to bring in the shower mass or press mass through one of the cover foil 25 or 26 in the cavity present around the semiconductor chips 5 around. Because of the flexibility of the related Mikropacks, it is however also possible to let in an execution form with open method of building the cavity 5 surrounding the semiconductor chip blank. A further execution example for the on passport cash unit 1 in that of the fig. The Fig shows 3 corresponding representations. 5. the arrangement of connection areas 3, LEITERNETZ 6, Kunststoffzwischenträger 7, carrier foil 9 and semiconductor chips 5 corresponds that in the fig. 3 shown arrangements. This arrangement is additional through it versteift, that at its underside eineals ground foil 28 finished ground arrangement z. B. by means of Laminieren arranged is. The ground foil 28 so is dimensioned that it is 21 on passport cash into the window good Aussparung. The top of the on passport cash unit 1 is equipped for sealing the cavity 5 present around the semiconductor chip and to the manufacture one up of surface 3 even to the increased connection areas of the unit 1 with a cover foil 27, whose thick z. B. in about the thick of the leader network 6 corresponds and shows that for example there Aussparungen, where on the surface of the Kunststoffzwischenträgers 7 the leader network 6. The cavity 5 present around the semiconductor chip can either remain free oder entsprechtend the executions to the fig. 4 spilt or become verpresst. The on passport cash EINHEIT 1- after fig. 5 becomes corresponding to that the fig. Equip 4 made executions into the Aussparung of 21 the cards carrier 2 eingepasst and at its underside with a first cover foil 26 and at its top with a second cover foil 25 and forms then the invention appropriate for card showing portable an even surface 4. A further execution example for the on passport cash unit 1 shows the fig. 6. it corresponds essentially. 5 to the execution example of the Fig, however the external connection areas 3 in comparison with that in the fig. are here. 5 shown thickens, z. B. STATT 0,2 mm 2 mm thickly. As a cover foil 27 and carrier foil 9, dann bei can play used become wise gleichstarke Laminat. The on passport cash unit 1 is terminated on its underside also with a ground foil 28. In that in the figures 7 and 8 gezeigten Ausführungsbeispiel play is planned for the on passport cash unit 1 in place of a

ground foil 28 a cavity 5 showing with one a larger area than the semiconductor chip 30 overlooked form piece 29. That form pieces 29 so can be formed that it shows a further step good cavity to the reception of the Kunststoffzwischenträgers 7. That form pieces 29 can be made as part prefabricated as a plastic syringe part or Kunststoffgiessteil, can be produced it however also as a stamped Thermoplastfolie. Corresponding to the figures 5 and 6 becomes the top of the unit 1 with a thin (fig. 7) cover foil 27 or in reinforced execution of the connection areas 3 (cf. Fig. 6) with one somewhat thicker cover foils 27 (fig. Accommodate 8). The chips 5 is in the fig. 7 so into the unit 1 incorporated that its lötfähigen connections 17 are on its underside. It is however - this applies also to the execution examples of the figures 3 to 6 - also possible to incorporate the semiconductor chips 5 in the manner into the unit 1, that the lötfähigen connections 17 like in the execution example of the fig. Show 8 towards the top. The cavity present around the semiconductor chips 5 around can in the execution examples after figures 7 and 8 either freely remain or filled out become in one of the manners described above with plastic. In a further figürlich dargestellten Ausführungs form it is not planned to received the stairway good form of the form piece 29 through the Aufeinanderlaminieren threefold plastic foil. The execution examples 3 to 8 shown in figures for the on passport cash unit 1 are carried out as part uniform, that is 3 smooth up to the increased outside areas. The on passport cash unit 1 can be formed a unit respectively the Fig. 4 correspondingly with first DECKFOLIE 26, cards carriers 2 and second cover foil 25 to the portable card 4, that shows smooth surfaces. The thick of the cover foil 25 and especially 26 are to be selected so, that the Gesamtdicke of the Kartez. B. a desired standard corresponds. The portable card 4 is not shows in a harvest device, that semiconductor chips 5 no Masseverbindung auf> so that the danger of electrostatic charges exists, that can lead especially in use of a MOS-chip to the destruction of the semiconductor chip 5. In order to create here remedy, it recommends itself to plan an electrically leading layer in continued education of the invention on at least a surface of the unit 1 or to carry out at least one surfaces arrangement of the unit 1 electrically leading. The electrically leading layer bzw. surface is connected can with that, connection areas 3 forming external the mass contact electrically leading advantage hafterweise the unit 1 in the manner ganzflächig, i.e. beidseitig, with which electrically leading layer are accommodated, that solely the areas of the external connection areas 3 that do not serve as a mass contact, by which electrically leading layer are left out. Corresponding to these executions, the ground foil 28 or the cover foil 27 or both foil after the figures 5 can for example and 6 out of electrically leading material produced be. A cover foil 27 is used is to be respected out of electrically leading material, on that that the cover foil 27 of the external connection areas 3 that do not form the mass contact is arranged, electrically isolating. This ability z. B. through arrangement one in the thick insulating layer 27 corresponding to the cover foil 31 around the corresponding connection areas 3 around causes become. Becomes in the execution form after fig. 8 that form pieces 29 out of an electrically leading material produced, can be reached a further reduction of the Aufladeproblems in that the back of 16 the semiconductor chip 5 is carried out also metallisiert and z. B. by means of an electrically leading glue on the top of the form piece 29 glued becomes and connected is therefore also with the mass contact of the chip 5. It is also possible, to carry out the card 4 so that at least a top of the card connected with an electrically leading layer oversight ware, that with that, the mass contact connection areas 3 forming external electrically leading. The electrically leading layer is to be realized in more simply manner in the manner that the first cover foil 26 are produced and or the second cover foil 25 out of electrically leading material. Regarding the isolation of the connection areas 3 planned external as mass contact, the above legend does not count. Layers leading Dielektrisch can consist of metallisiertem Kunststoff, that the cover foil is mounted. They can be raised also by up steam, imprint or in activated Polyimid by means of a galvanic procedure on the related Kunststofffolien. Further it is possible to use metal foil or to make that form pieces 29 out of metal. Through the invention appropriate for construction of the portable card 4 successful to plan in economically more favorable manner one the semiconductor chips 5 and the zum Aussenanschluss necessary external connection area unit 3 containing 1, that

separately by the foils 25 and 27 can be produced and tested and the card carriers 2, and that as part uniform, that up to the increased external connection areas 3 smoothly carried out and is therefore good handhabbar, carried out is 1 with slight expense to the card 4 weiterverarbeitet will can. 8 Figures 16 Patentansprüche